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Memorandum

SUBJ Evaluation of the **Shaw Air Force Base's** status under the RCRIS Corrective Action Environmental Indicator Event Codes (CA725 and CA750)
EPA I.D. Number: SC7 570 024 466

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To Shaw Air Force Base – Project File
EPA I D Number SC7 570 024 466
Central File Number 50547

Date September 10, 2001

I. PURPOSE OF MEMO

This memo is written to formalize an evaluation of Shaw Air Force Base's status in relation to the following corrective action event code defined in the Resource Conservation and Recovery Information System (RCRIS)

1 Current Human Exposures Under Control (CA725),
2 Migration of Contaminated Groundwater Under Control (CA750)

II. HISTORY OF ENVIRONMENTAL INDICATOR EVALUATIONS AT THE FACILITY AND REFERENCE DOCUMENTS

This particular evaluation is the second evaluation for Shaw Air Force Base The previous evaluation resulted in a determination of YE for CA725 and NO for CA750 The evaluation was based on RFI Reports and groundwater plumes migrating off base Additional investigation implied that human exposures were not controlled, though the determination was unclear The Department determined that additional investigation was needed to prior to revision of the EI memo Though the evaluation was not revised to change the CA725 from YE to NO, dates were entered in to the EI schedule to document the Department's concern that human exposures may not be controlled

Since the initial evaluation, Shaw Air Force Base has instituted an Interim Measure at AOC F to contain groundwater contamination and prevent further off base migration The base has also conducted additional investigation and has implemented a monitoring plan to ensure that groundwater contamination from SWMU 78 does not continue to migrate The additional investigation at SWMU 78 identified surface soil contamination that presents a current unacceptable risk to receptors Therefore, SAFB has fenced the contaminated area in the interim prior to completing a surface soil removal action

III. FACILITY SUMMARY

Shaw Air Force Base is an active DoD installation located in Sumter County, South Carolina The base is located approximately seven miles west of the city of Sumter and is approximately forty-four miles east of Columbia The base is located in a semirural area Most of the surround community is vacant, wooded, or used for agricultural purposes Some residential and commercial development has occurred west of the base Former and current activities at Shaw Air Force Base include vehicle maintenance, aircraft maintenance, training exercises, and periodic barracks construction and demolition

The regulated unit, a hazardous waste storage facility, was clean closed in 1999, and the base is now subject to a HSWA only permit The permit identifies 96 SWMUs and 14 AOCs Of these, 6 are undergoing RFI, 88 require NFA, 3 require Land Use Controls, 8 are being investigated under RCRA Subtitle I, and 3 have remedies selected but not completed

IV. CONCLUSION FOR CA725

As explained in Attachment 1, because human exposures to contamination are currently controlled for soil, groundwater, and surface water, it is recommended that CA725 YE be entered into RCRIS

V. CONCLUSION FOR CA750

As explained in Attachment 2, because migration of groundwater contamination is controlled, it is recommended that CA750 YE be entered into RCRIS

VI. SUMMARY OF FOLLOW-UP ACTIONS

Because a determination of CA750 YE have been made, there are no follow up actions required at this time

Attachments:

1 CA725 Current Human Exposures Under Control
2 CA750 Migration of Contaminated Groundwater Under Control

ATTACHMENT 1

DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION
RCRA Corrective Action
Environmental Indicator (EI) RCRIS Code (CA725)
Current Human Exposures Under Control

Facility Name: Shaw Air Force Base
Facility Address: Sumter, South Carolina 29152
Facility EPA ID #: SC7 570 024 466

1 Has **all** available relevant/significant information on known and reasonably suspected releases to soil, groundwater, surface water/sediments, and air, subject to RCRA Corrective Action (e g , from Solid Waste Management Units (SWMU), Regulated Units (RU), and Areas of Concern (AOC)), been **considered** in this EI determination?

__X__ If yes - check here and continue with #2 below,

____ If no - re-evaluate existing data, or

____ If data are not available skip to #6 and enter "IN" (more information needed) status code

BACKGROUND

Definition of Environmental Indicators (for the RCRA Corrective Action)

Environmental Indicators (EI) are measures being used by the RCRA Corrective Action program to go beyond programmatic activity measures (e.g , reports received and approved, etc) to track changes in the quality of the environment The two EI developed to date indicate the quality of the environment in relation to current human exposures to contamination and the migration of contaminated groundwater An EI for non-human (ecological) receptors is intended to be developed in the future

Definition of "Current Human Exposures Under Control" EI

A positive "Current Human Exposures Under Control" EI determination ("YE" status code) indicates that there are no "unacceptable" human exposures to "contamination" (i e , contaminants in concentrations in excess of appropriate risk-based levels) that can be reasonably expected under current land- and groundwater-use conditions (for all "contamination" subject to RCRA corrective action at or from the identified facility (i e , site-wide))

Relationship of EI to Final Remedies

While Final remedies remain the long-term objective of the RCRA Corrective Action program the EI are near-term objectives which are currently being used as Program measures for the Government Performance and Results Act of 1993, GPRA) The "Current Human Exposures Under Control" EI are for reasonably expected human exposures under current land- and groundwater-use conditions ONLY, and do not consider potential future land- or groundwater-use conditions or ecological receptors The RCRA Corrective Action program□s overall mission to protect human health and the environment requires that Final remedies address these issues (i e , potential future human exposure scenarios, future land and groundwater uses, and ecological receptors)

Duration / Applicability of EI Determinations

EI Determinations status codes should remain in RCRIS national database ONLY as long as they remain true (i e , RCRIS status codes must be changed when the regulatory authorities become aware of contrary information)

2 Are groundwater, soil, surface water, sediments, or air **media** known or reasonably suspected to be **"contaminated"**[1] above appropriately protective risk-based "levels" (applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA Corrective Action (from SWMUs, RUs or AOCs)?

Media	Yes	No	?	Rationale/Key Contaminants
Groundwater	X			Organics, inorganics, metals
Air (indoors)[2]		X		
Surface Soil (e g , <2				

[1] "Contamination" and "contaminated" describes media containing contaminants (in any form, NAPL and/or dissolved, vapors, or solids, that are subject to RCRA) in concentrations in excess of appropriately protective risk-based "levels" (for the media, that identify risks within the acceptable risk range)

[2] Recent evidence (from the Colorado Dept of Public Health and Environment, and others) suggest that unacceptable indoor air concentrations are more common in structures above groundwater with volatile contaminants than previously believed This is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration necessary to be reasonably certain that indoor air (in structures located above (and adjacent to) groundwater with volatile contaminants) does not present unacceptable risks

Media	Yes	No	?	Rationale/Key Contaminants
ft)	X			Organics, inorganics, pesticides,
Surface Water		X		
Sediment		X		
Subsurface Soil (e g , >2 ft)	X	X		
Air (outdoors)		X		

____ If no (for all media) - skip to #6, and enter "YE," status code after providing or citing appropriate "levels," and referencing sufficient supporting documentation demonstrating that these "levels" are not exceeded

_X_ If yes (for any media) - continue after identifying key contaminants in each "contaminated" medium, citing appropriate "levels" (or provide an explanation for the determination that the medium could pose an unacceptable risk), and referencing supporting documentation

____ If unknown (for any media) - skip to #6 and enter "IN" status code.

Rationale and Reference(s):
Phase I and II RFI Report SWMU 78
Second Quarter 2001 Interim Remedial Action Operation Report, SWMU 59
First 2001 Semi-Annual Interim Remedial Action Operation Report, AOC-F and AOC-D
Final Remedial Investigation Report, Operable Unit 4 - SWMU 59
Draft Addendum Final Feasibility Study/Corrective Measures Study Report, SWMU 59
Second Quarter 2001 Interim Remedial Action Operation Report, SWMU 59

3. Are there **complete pathways** between "contamination" and human receptors such that exposures can be reasonably expected under the current (land- and groundwater-use) conditions?

RCRA Corrective Action
Environmental Indicator (EI) RCRIS Event Code CA725 and CA750

Summary Exposure Pathway Evaluation Table
Potential **Human Receptors** (Under Current Conditions)

"Contaminated" Media	Residents	Workers	Day-Care	Construction	Tress-passers	Recreation	Food[3]
Groundwater	No	No	No	No	No	No	No
Air (indoors)	No	No	No	No	No	No	No
Soil (surface, e g , <2 ft)	No	No	No	No	No	No	No
Surface Water	N/C	N/C	N/C	N/C	N/C	N/C	N/C
Sediment	N/C	N/C	N/C	N/C	N/C	N/C	N/C
Soil (subsurface, e g , >2 ft)	No	No	No	No	No	No	No
Air(outdoors)	N/C	N/C	N/C	N/C	N/C	N/C	N/C

Instructions for Summary Exposure Pathway Evaluation Table

1 For Media which are not "contaminated" as identified in #2, please strike-out specific Media, including Human Receptors' spaces, or enter "N/C" for not contaminated

2 Enter "yes" or "no" for potential "completeness" under each "Contaminated" Media -- Human Receptor combination (Pathway)

Note In order to focus the evaluation to the most probable combinations some potential "Contaminated" Media - Human Receptor combinations (Pathways) do not have assigned spaces in the above table While these combinations may not be probable in most situations they may be possible in some settings and should be added as necessary

__X__ If no (pathways are not complete for any contaminated media-receptor combination) - skip to #6, and enter "YE" status code, after explaining and/or

[3] Indirect Pathway/Receptor (e g , vegetables, fruits, crops, meat and dairy products, fish, shellfish, etc)

referencing condition(s) in-place, whether natural or man-made, preventing a complete exposure pathway from each contaminated medium (e g , use optional Pathway Evaluation Work Sheet to analyze major pathways)

____ If yes (pathways are complete for any "Contaminated" Media - Human Receptor combination) - continue after providing supporting explanation

____ If unknown (for any "Contaminated" Media - Human Receptor combination) - skip to #6 and enter "IN" status code

Rationale and Reference(s): Additional investigation implied that human exposures were not controlled at SWMU 78, though the determination was unclear The Department determined that additional investigation was needed to prior to revision of the EI memo Though the evaluation was not revised to change the CA725 from YE to NO, dates were entered in to the EI schedule to document the Department's concern that human exposures may not be controlled The base has also conducted additional investigation and has implemented a monitoring plan to ensure that groundwater contamination from SWMU 78 does not continue to migrate The additional investigation at SWMU 78 identified surface soil contamination that presents a current unacceptable risk to receptors Therefore, SAFB has fenced the contaminated area in the interim prior to completing a surface soil removal action
Phase I and II RFI Report SWMU 78

4 Can the **exposures** from any of the complete pathways identified in #3 be reasonably expected to be **"significant"** (i e , potentially "unacceptable" because exposures can be reasonably expected to be 1) greater in magnitude (intensity, frequency and/or duration) than assumed in the derivation of the acceptable "levels" (used to identify the "contamination"), or 2) the combination of exposure magnitude (perhaps even though low) and contaminant concentrations (which may be substantially above the acceptable "levels") could result in greater than acceptable risks)?

____ If no (exposures can not be reasonably expected to be significant (i e , potentially "unacceptable") for any complete exposure pathway) - skip to #6 and enter "YE" status code after explaining and/or referencing documentation justifying why the exposures (from each of the complete pathways) to "contamination" (identified in #3) are not expected to be "significant "

____ If yes (exposures could be reasonably expected to be "significant" (i e , potentially "unacceptable") for any complete exposure pathway) - continue after providing a description (of each potentially "unacceptable" exposure pathway) and explaining and/or referencing documentation justifying why the

exposures (from each of the remaining complete pathways) to "contamination" (identified in #3) are not expected to be "significant "

____ If unknown (for any complete pathway) - skip to #6 and enter "IN" status code

Rationale and Reference(s)

5 Can the "significant" **exposures** (identified in #4) be shown to be within **acceptable** limits?

____ If yes (all "significant" exposures have been shown to be within acceptable limits) - continue and enter "YE" after summarizing and referencing documentation justifying why all "significant" exposures to "contamination" are within acceptable limits (e g , a site-specific Human Health Risk Assessment)

____ If no (there are current exposures that can be reasonably expected to be "unacceptable")- continue and enter "NO" status code after providing a description of each potentially "unacceptable" exposure

____ If unknown (for any potentially "unacceptable" exposure) - continue and enter "IN" status code

Rationale and Reference(s)

Phase I and II RFI Report SWMU 78
Second Quarter 2001 Interim Remedial Action Operation Report, SWMU 59
First 2001 Semi-Annual Interim Remedial Action Operation Report, AOC-F and AOC-D
Final Remedial Investigation Report, Operable Unit 4 - SWMU 59
Draft Addendum Final Feasibility Study/Corrective Measures Study Report, SWMU 59
Second Quarter 2001 Interim Remedial Action Operation Report, SWMU 59

Check the appropriate RCRIS status codes for the Current Human Exposures Under Control EI event code (CA725), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (and attach appropriate supporting documentation as well as a map of the facility)

__X__ YE - Yes, "Current Human Exposures Under Control" has been verified

RCRA Corrective Action
Environmental Indicator (EI) RCRIS Event Code CA725 and CA750

Based on a review of the information contained in this EI Determination, "Current Human Exposures" are expected to be "Under Control" at Shaw Air Force Base in Sumter, South Carolina 29152 EPA ID # SC7 570 024 466 under current and reasonably expected conditions This determination will be re-evaluated when the Agency/State becomes aware of significant changes at the facility

____ NO - "Current Human Exposures" are NOT "Under Control "

____ IN - More information is needed to make a determination

Completed by(signature) Stacey French Date 9/10/01
(print) Stacey French
(title) Environmental Engineer Associate

Supervisor (signature) David Scaturo Date 9/12/01
(print) David Scaturo, P E , P G
(title) Manager
(EPA Region or State) South Carolina

Locations where References may be found

1 South Carolina Department of Health and Environmental Control, Columbia South Carolina
2 Shaw Air Force Base, SAFB, South Carolina 29152

Contact telephone and e-mail numbers

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ATTACHMENT 2
DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION
RCRA Corrective Action
Environmental Indicator (EI) RCRIS Event Code (CA750)
Migration of Contaminated Groundwater Under Control

Facility Name: Shaw Air Force Base
Facility Address: Sumter, South Carolina 29152
Facility EPA ID #: SC7 570 024 466

1 Has **all** available relevant/significant information on known and reasonably suspected releases to the groundwater media, subject to RCRA Corrective Action (e g , from Solid Waste Management Units (SWMU), Regulated Units (RU), and Areas of Concern (AOC)), been **considered** in this EI determination?

__X__ If yes - check here and continue with #2 below,

_____ If no - re-evaluate existing data, or

_____ If data are not available, skip to #8 and enter "IN" (more information needed) status code

BACKGROUND

Definition of Environmental Indicators (for the RCRA Corrective Action)

Environmental Indicators (EI) are measures being used by the RCRA Corrective Action program to go beyond programmatic activity measures (e g , reports received and approved, etc) to track changes in the quality of the environment The two EI developed to-date indicate the quality of the environment in relation to current human exposures to contamination and the migration of contaminated groundwater An EI for non-human (ecological) receptors is intended to be developed in the future

Definition of "Migration of Contaminated Groundwater Under Control" EI

A positive "Migration of Contaminated Groundwater Under Control" EI determination ("YE" status code) indicates that the migration of "contaminated" groundwater has stabilized, and that monitoring will be conducted to confirm that contaminated groundwater remains within the original "area of contaminated groundwater" (for all groundwater "contamination" subject to

RCRA corrective action at or from the identified facility (i e , site-wide))

Relationship of EI to Final Remedies

While Final remedies remain the long-term objective of the RCRA Corrective Action program the EI are near-term objectives which are currently being used as Program measures for the Government Performance and Results Act of 1993, GPRA) The "Migration of Contaminated Groundwater Under Control" EI pertains ONLY to the physical migration (i e , further spread) of contaminated ground water and contaminants within groundwater (e g , non-aqueous phase liquids or NAPLs) Achieving this EI does not substitute for achieving other stabilization or final remedy requirements and expectations associated with sources of contamination and the need to restore, wherever practicable, contaminated groundwater to be suitable for its designated current and future uses

Duration / Applicability of EI Determinations

EI Determinations status codes should remain in RCRIS national database ONLY as long as they remain true (i e , RCRIS status codes must be changed when the regulatory authorities become aware of contrary information)

2 Is **groundwater** known or reasonably suspected to be **"contaminated"**[4] above appropriately protective "levels" (i e , applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA Corrective Action, anywhere at, or from, the facility?

__X__ If yes - continue after identifying key contaminants, citing appropriate "levels," and referencing supporting documentation

____ If no - skip to #8 and enter "YE" status code, after citing appropriate "levels," and referencing supporting documentation to demonstrate that groundwater is not "contaminated "

____ If unknown - skip to #8 and enter "IN" status code

Rationale and Reference(s)

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[4] "Contamination" and "contaminated" describes media containing contaminants (in any form, NAPL and/or dissolved, vapors, or solids, that are subject to RCRA) in concentrations in excess of appropriate "levels" (appropriate for the protection of the groundwater resource and its beneficial uses)

SWMU 59

Rationale:

SWMU 59 is a former fire training area The site has undergone extensive investigation for groundwater contamination by volatile organic compounds (VOCs) including 1,1,1-trichloroethane (TCA) and benzene In April 2001, TCA levels across SWMU 59 ranged from non-detect to 14,000 ug/L, exceeding TCA's federal maximum contaminant level (MCL) of 200 ug/L Benzene concentrations range from non-detect to 290 ug/L, exceeding benzene's MCL of 5 ug/L The Final Phase II RFI for SWMU 59 was approved by the SCDHEC January 18, 2001 Groundwater contamination at SWMU 59 is considered to be fully delineated Quarterly groundwater monitoring is conducted as a portion of the existing interim measure, and will be continued as a part of the final remedy

References:

Second Quarter 2001 Interim Remedial Action Operation Report, SWMU 59, dated August 1, 2001

AOC F

Rationale:

Groundwater at AOC-F is impacted by chlorinated solvents, primarily tetrachloroethylene (PCE) and trichloroethylene (TCE) These compounds have entered groundwater from multiple sources, and have penetrated a deep aquifer Contamination has migrated off-site During the April 2001 groundwater monitoring event, PCE levels ranged from non-detect to 170 ug/L, exceeding PCE's MCL of 5 ug/L TCE levels ranged from non-detect to 1300 ug/L across the site, exceeding TCE's MCL of 5 ug/L The final RFI for AOC-F was approved by SCDHEC on February 24, 1997 Groundwater monitoring is conducted semi-annually as a part of the interim measure for the site, and will be conducted as a part of the final remedy

References:

First 2001 Semi-Annual Interim Remedial Action Operation Report, AOC-F and AOC-D, dated July 31, 2001

3 Has the **migration** of contaminated groundwater **stabilized** such that contaminated groundwater is expected to remain within "existing area of contaminated groundwater"[6] as defined by the monitoring locations designated at the time of this determination?

__X__ If yes - continue, after presenting or referencing the physical evidence (e g , groundwater sampling/measurement/migration barrier data) and rationale why contaminated groundwater is expected to remain within the (horizontal or vertical) dimensions of the "existing area of groundwater contamination"[6])

____ If no (contaminated groundwater is observed or expected to migrate beyond the designated locations defining the "existing area of groundwater contamination"[5]) - skip to #8 and enter "NO" status code, after providing an explanation

____ If unknown - skip to #8 and enter "IN" status code

SWMU 59

Rationale:

A permeable reactive barrier (PRB) was installed as an IM at SWMU 59 in December of 1998 This action has eliminated the migration of TCA beyond the barrier Groundwater is monitored quarterly in order to track levels of contaminants both up-gradient and down-gradient of the PRB Currently, concentrations of petroleum compounds and TCA breakdown products exceed federal maximum contaminant levels (MCLs) beyond the influence of the PRB Historical data indicate that this condition existed prior to installation of the PRB, which was placed as far down-gradient as practicable At the facility boundary, groundwater discharges to a surface water body (Long Branch) Long Branch acts as a down-gradient boundary for migration of the contaminated groundwater During the remedial investigation, a monitoring well was installed across Long Branch, and was shown not to contain VOCs Additional evidence from groundwater elevation data suggests that the contaminated portion of the shallow aquifer at SWMU 59 discharges to Long Branch, limiting the migration of contaminants within the aquifer

References:

Final Remedial Investigation Report, Operable Unit 4, Former Fire Training Area No 1, SWMU 59, dated February 17, 1995

Draft Addendum to Final Feasibility Study/Corrective Measures Study Report, SWMU 59, dated May 22, 2001

Second Quarter 2001 Interim Remedial Action Operation Report, SWMU 59, dated August 1, 2001

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5 existing area of contaminated groundwater" is an area (with horizontal and vertical dimensions) that has been verifiably demonstrated to contain all relevant groundwater contamination for this determination, and is defined by designated (monitoring) locations proximate to the outer perimeter of "contamination" that can and will be sampled/tested in the future to physically verify that all contaminated" groundwater remains within this area, and that the further migration of "contaminated" groundwater is not occurring Reasonable allowances in the proximity of the monitoring locations are permissible to incorporate formal remedy decisions (i e , including public participation) allowing a limited area for natural attenuation

AOC-F

Rationale:

A groundwater remediation system, consisting of three extraction wells and a treatment plant was installed at AOC-F as an interim measure (IM) The IM has been in operation since January 1998 This system was designed to achieve hydraulic control of the contaminated portion of the aquifer Capture zone analysis conducted in 2000, suggested that a portion of the contaminant plume was not being captured The addition of a fourth extraction well in early 2001 has resulted in complete capture of the plume at the established boundary

References:

Draft Final Addendum Interim Corrective Measure Plans and Specifications, Groundwater Extraction and Treatment System, Upper Black Creek Aquifer, Operable Unit 2B (AOC-F), dated June 30, 2000

Operable Unit 2B/AOC F Interim Measure Modification Update Draft Addendum to Final FS/CMS Update, Shaw AFB, South Carolina Team Meeting, August 28, 2001, Myrtle Beach, South Carolina

4 Does "contaminated" groundwater **discharge** into **surface water** bodies?

__X__ If yes - continue after identifying potentially affected surface water bodies

____ If no - skip to #7 (and enter a "YE" status code in #8, if #7 = yes) after providing an explanation and/or referencing documentation supporting that groundwater "contamination" does not enter surface water bodies

____ If unknown - skip to #8 and enter "IN" status code

SWMU 59

Rationale:

Contaminated groundwater from SWMU 59 discharges to Long Branch Although the primary contaminant TCA is essentially absent down-gradient of the PRB, breakdown products dichloroethane (DCA), dichloroethylene (DCE) and vinyl chloride (VC) persist down-gradient of the PRB, and are detected in surface water Benzene, a petroleum constituent present at the site, is not treated by the PRB, and has been detected in past surface water samples

References:

Second Quarter 2001 Interim Remedial Action Operation Report, SWMU 59, dated August 1, 2001

AOC-F

Rationale:

Contaminated groundwater at AOC F does not discharge to surface water

References:

First 2001 Semi-Annual Interim Remedial Action Operation Report, AOC-F and AOC-D, dated July 31, 2001

5 Is the **discharge** of "contaminated" groundwater into surface water likely to be **"insignificant"** (i e , the maximum concentration[7] of each contaminant discharging into surface water is less than 10 times their appropriate groundwater "level," and there are no other conditions (e g , the nature and number of discharging contaminants, or environmental setting) which significantly increase the potential for unacceptable impacts to surface water, sediments, or eco-systems at these concentrations)?

__X__ If yes - skip to #7 (and enter "YE" status code in #8 if #7 = yes), after documenting 1) the maximum known or reasonably suspected concentration[7] of key contaminants discharged above their groundwater "level," the value of the appropriate "level(s)," and if there is evidence that the concentrations are increasing, and 2) providing a statement of professional judgment/explanation (or reference documentation) supporting that the discharge of groundwater contaminants into the surface water is not anticipated to have unacceptable impacts to the receiving surface water, sediments, or eco-system

____ If no - (the discharge of "contaminated" groundwater into surface water is potentially significant) - continue after documenting 1) the maximum known or reasonably suspected concentration[7] of each contaminant discharged above its groundwater "level," the value of the appropriate "level(s)," and if there is evidence that the concentrations are increasing, and 2) for any contaminants discharging into surface water in concentrations[6] greater than 100 times their appropriate groundwater "levels," providing the estimated total amount (mass in kg/yr) of each of these contaminants that are being discharged (loaded) into the surface water body (at the time of the determination), and identifying if there is evidence that the amount of discharging contaminants is increasing

____ If unknown - enter "IN" status code in #8

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6 As measured in groundwater prior to entry to the groundwater-surface water/sediment interaction (e g , hyporheic) zone

SWMU 59

Rationale:

Surface water sampling conducted at SWMU 59 has documented the presence of contaminants in surface water In January 2001, 1,1-DCE, cis-1,2-DCE, and VC, breakdown products of TCA, were detected in a surface water sample below their respective MCLs During the April 2001 sampling event, only 1,1-dichloroethylene (1,1-DCE) was detected at a level of 1 0 ug/L This is below 1,1-DCE's MCL of 7 0 ug/L All other VOCs were below detectable limits for this sampling event Continued degradation of chlorinated VOCs by the PRB is expected to reduce the mass of contaminants migrating toward Long Branch, and thus the amount of contamination actually discharging to surface water.

Reference:

Second Quarter 2001 Interim Remedial Action Operation Report, SWMU 59, dated August 1, 2001

6 Can the **discharge** of "contaminated" groundwater into surface water be shown to be "**currently acceptable**" (i e , not cause impacts to surface water, sediments or eco-systems that should not be allowed to continue until a final remedy decision can be made and implemented[7])?

____ If yes - continue after either 1) identifying the Final Remedy decision incorporating these conditions, or other site-specific criteria (developed for the protection of the site's surface water, sediments, and eco-systems), and referencing supporting documentation demonstrating that these criteria are not exceeded by the discharging groundwater, OR 2) providing or referencing an interim-assessment,[8] appropriate to the potential for impact, that shows the discharge of groundwater contaminants into the surface water is (in the opinion of a trained specialists, including ecologist) adequately protective of receiving surface water, sediments, and eco-systems, until such time when a full assessment and final remedy decision can be made Factors

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[7] Note, because areas of inflowing groundwater can be critical habitats (e g , nurseries or thermal refugia) for many species, appropriate specialist (e g , ecologist) should be included in management decisions that could eliminate these areas by significantly altering or reversing groundwater flow pathways near surface water bodies

[8] The understanding of the impacts of contaminated groundwater discharges into surface water bodies is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration to be reasonably certain that discharges are not causing currently unacceptable impacts to the surface waters, sediments or eco-systems

which should be considered in the interim-assessment (where appropriate to help identify the impact associated with discharging groundwater) include surface water body size, flow, use/classification/habitats and contaminant loading limits, other sources of surface water/sediment contamination, surface water and sediment sample results and comparisons to available and appropriate surface water and sediment "levels," as well as any other factors, such as effects on ecological receptors (e g , via bio-assays/benthic surveys or site-specific ecological Risk Assessments), that the overseeing regulatory agency would deem appropriate for making the EI determination

____ If no - (the discharge of "contaminated" groundwater can not be shown to be "**currently acceptable**") - skip to #8 and enter "NO" status code, after documenting the currently unacceptable impacts to the surface water body, sediments, and/or eco-systems

____ If unknown - skip to 8 and enter "IN" status code

7 Will groundwater **monitoring** / measurement data (and surface water/sediment/ecological data, as necessary) be collected in the future to verify that contaminated groundwater has remained within the horizontal (or vertical, as necessary) dimensions of the "existing area of contaminated groundwater?"

_X_ If yes - continue after providing or citing documentation for planned activities or future sampling/measurement events Specifically identify the well/measurement locations that will be tested in the future to verify the expectation (identified in #3) that groundwater contamination will not be migrating horizontally (or vertically, as necessary) beyond the "existing area of groundwater contamination "

____ If no - enter "NO" status code in #8

____ If unknown - enter "IN" status code in #8

SWMU 59

Rationale:

Groundwater monitoring is conducted quarterly to verify the effectiveness of the IM at SWMU 59, and will be incorporated as a part of the final remedy for the site The proposed final remedy for SWMU 59 also includes monitoring of natural attenuation parameters on an annual basis During the most recent monitoring event, 36 monitoring wells were sampled for VOCs by EPA Method 8260b In addition, five surface water discharge locations were monitored using passive diffusion samplers Diffusion samplers

were also collected from two monitoring wells for comparison of data One surface water sample was also collected from Long Branch During the first quarter of 2001, 57 groundwater monitoring wells were sampled, along with five passive diffusion samplers, and one surface water sample This reflects an expanded sampling network that is monitored on an annual basis Shaw AFB is currently investigating the potential to use passive diffusion samplers in all wells to replace current sample collection procedures

References:

First Quarter 2001 Interim Remedial Action Operation Report, SWMU 59, dated June 6, 2001

Second Quarter 2001 Interim Remedial Action Operation Report, SWMU 59, dated August 1, 2001

AOC F

Rationale:

Quarterly groundwater monitoring was conducted at AOC F from 1996 through the first half of 2000 Groundwater is currently monitored on a semi-annual basis for VOCs During the first semi-annual 2001 groundwater monitoring event, data from 73 wells were reviewed Groundwater monitoring will continue to be conducted in order to verify the effectiveness of the remedial action

References:

First 2001 Semi-Annual Interim Remedial Action Operation Report, AOC-F and AOC-D, dated July 31, 2001

8 Check the appropriate RCRIS status codes for the Migration of Contaminated Groundwater Under Control EI (event code CA750), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (attach appropriate supporting documentation as well as a map of the facility)

__X__ YE - Yes, "Migration of Contaminated Groundwater Under Control" has been verified Based on a review of the information contained in this EI determination, it has been determined that the "Migration of Contaminated Groundwater" is "Under Control" at Shaw Air Force Base, EPA ID #SC7 570 024 466, located at Shaw Air Force Base, South Carolina 29152-5126 Specifically, this determination indicates that the migration of 'contaminated" groundwater is under control, and that monitoring will be conducted to confirm that contaminated groundwater remains within the "existing area of contaminated groundwater "

RCRA Corrective Action
Environmental Indicator (EI) RCRIS Event Code CA725 and CA750

This determination will be re-evaluated when the Agency becomes aware of significant changes at the facility

____ NO - Unacceptable migration of contaminated groundwater is observed or expected

____ IN - More information is needed to make a determination

Completed by(signature) Stacey French Date 9/10/01
(print) Stacey French
(title) Environmental Engineer Associate

Supervisor (signature) David Scaturo Date 9/12/01
(print) David Scaturo, P E , P G
(title) Manager
(EPA Region or State) South Carolina

Locations where References may be found

1 South Carolina Department of Health and Environmental Control, Columbia South Carolina
2 Shaw Air Force Base, SAFB, South Carolina 29152

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